

NOTES ON THE ANATOMY AND TAXONOMY OF CERTAIN LAMPSILINÆ
FROM THE GULF DRAINAGE

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MEDIONIDUS ACUTISSIMUS (Lea).

Also this species differs from *M. conradicus* in the reticulated painting and the coarser corrugations of the posterior slope. It differs from *M. parvulus* by the fact that the rays are more frequently present and rather broad (but also composed of reticulations). From both, *conradicus* and *parvulus*, it is distinguished by more prominent posterior ridge and pointed posterior end. The nacre is very frequently of a reddish or salmon color.

The soft parts have been described by Lea (under *U. rubellinus*, Obs. 6. 1858). He reports that the marsupium occupies nearly the whole length of the outer gill, with a wide reddish-brown border on the edge. The inner lamina of the inner gill is free nearly half of the length of the abdominal sac.

In my specimens I have found that the inner lamina of the inner gills is free for about one-half of the abdominal sac (more or less). In the gravid female, there are 2 to 4 long papillae on the mantle-edge in the same position as in the other species. These papillae are cylindro-conical in shape. The marsupium is large, yet it does not occupy the whole gill, but a large section in the middle of it, leaving non-marsupial a more considerable portion anteriorly, and a smaller portion posteriorly (it is quite probable that it is smaller in younger specimens). The number of ovisacs on the left side is at least 22 (with some posterior ones discharged); on the right side, they are hard to count, since they are largely discharged, but probably there were still more of them. Also my specimen has the margin of the marsupium broadly colored with brown pigment. Color of soft parts rather light: the black of *conradicus* and *parvulus* being replaced by brown.

Glochidium of the same shape as that of the other species, but larger: L. 0.26 to 0.27, H. 0.32 to 0.33 mm.

Thus the anatomical investigation furnishes in the larger marsupium with brown edge, in the prevailing brown, not black, pigment of the soft parts, and in the larger glochidia additional specific characters for *M. acutissimus*. The latter, in its affinities, if more remote from *conradicus*, while *parvulus* stands very close to this.

4. CARUNCULINA PAULA (Lea) (1840).

Simpson, 1914, p. 159.

Choctawhatchee River, Blue Springs, Barbour Co., Ala.—soft parts of 4 males and 5 barren females, H. H. Smith coll., Oct., 1915.

The anatomy of these specimens agrees in all respects with that of *C. parva* (Barn.) (see: Ann. Carn. Mus. 8, 1912, p. 338, and NAUT. 28, 1915, p. 129). In one of my specimens, a female, the supraanal opening is closed, in the others open. There is some blackish pigment at the edge of the marsupium. The caruncle is white or brownish.

These specimens have been identified (as *Lampsilis paula*) by B. Walker, but since I do not possess the shells, I cannot exactly say what Walker understood by this name. However, specimens in the Carnegie Museum from various sources, among them two thus labeled, received from the Alabama Museum (from Chattahoochee River, Columbus, Muscogee Co., Ga.), hardly differ from *C. parva* (Barnes). They do not have the cloth-like epidermis seen in the typical *parva*, and young shells are not so black, but more greenish, with lighter concentric bands. Further, the female is more distinctly swollen and dilated in the postbasal region. But these characters occasionally may turn up in *C. parva*, chiefly in southwestern (Arkansas) material.

5. CARUNCULINA MESTA (Lea) (1841).

Toxolasma lividum (Raf.) Ortmann, Proc. Amer. Philos. Soc. 57, 1918, p. 573; *Car. mæsta* Ortmann, NAUT. 34, 1921, p. 89.

U. corvunculus Lea, 1868.

Othcalooga Creek, Calhoun, Gordon Co., Ga.—a number of shells, and soft parts of one gravid female, H. H. Smith coll., July, 1913.

Choccolocco Creek, White Plains, Calhoun Co., Ala.—1 barren female with soft parts, H. H. Smith coll., July 31, 1915.

All these specimens were labeled *corrunculus* by Walker. I have pointed out, that the shell named *corrunculus* cannot be distinguished from *T. lividum* (= *C. mæsta*) of the upper Tennessee drainage, and also the soft parts do not differ from specimens from East Tennessee and the Ozarks (NAUT. 34, 1921, p. 89). Also the glochidia are the same.

My specimen with glochidia was collected in July, which confirms the late end of the breeding season observed in other instances in this species.

This is one of the species indicating the close connection of the Alabama-fauna with that of the Tennessee. *C. mæsta* is found in the Cumberland-Tennessee drainages and in the Ozarks, and its variety *glans* (Lea) in the central basin, south to Arkansas, but not on the Gulf plain. But the typical *mæsta* is present again (under the name of *corrunculus*) in the Alabama drainage, chiefly in the headwaters. It should be mentioned, in this connection, that *glans* has been reported by Simpson (1914, p. 154) from Etowah River, Ga.: there is no doubt, in my opinion, that this refers to *mæsta*.

6. MICROMYA NEBULOSA (Conrad) (1834).

Ortmann, Proc. Amer. Philos. Soc. 57, 1918, p. 577.

This is a common species in the Cumberland and Tennessee drainages, and is very variable. But it is also found in the Alabama drainage, and in the Chattahoochee system in Georgia. In fact, its *type-locality* is in the headwaters of the Black Warrior River in Alabama ("mountainous regions of Alabama, in the Black Warrior River").

The following synonyms founded upon specimens from this region have been ascertained previously (l. c.).

U. radians Lea (1857). Probably a rather normal female, with wide rays. Nacre white or rose. Othcalooga Creek (near Calhoun), Gordon Co., Ga. (tributary to Oostanaula, headwaters of Coosa).

U. jonesi Lea (1859). Normal female, with narrow rays.

Nacre white or salmon. Euharlee Creek, Bartow Co., Ga. (tributary of Etowah River, headwaters of Coosa).

U. sparus Lea (1868). A normal male with well developed rays. Nacre salmon. Swamp Creek, Whitfield Co., Ga. (tributary to Conasauga River, south of Dalton, headwaters of Coosa).

U. linguaeformis Lea (1860). A male, with poorly developed rays, but normal in shape. Columbus, Ga. (Chattahoochee drainage; also reported from French Broad River in Tennessee).

U. simus Lea (1838). A male with strongly developed rays, originally described from Cumberland River, but reported by Simpson (1914, p. 124) also from Othcalooga Creek Gordon Co., Ga.

To these, however, should be added the following synonyms.

U. planus Lea (1860). Already Simpson (1914, p. 125) suspects that this is only a form of *nebulosus*. The figure represents a male, and it is a rather short *nebulosus*, with rays well-developed. Such specimens are not at all rare. Coosa River, Wetumpka, Elmore Co., Ala.

U. difficilis Lea (1868). Made a synonym of *planus* by Simpson. The figured specimen is a small, rather shoot male, with few rays. Swamp Creek, Whitfield Co., Ga. (also given from headwaters of Holston River, Washington Co., Va.).

I have before me a rather large number of this species from the Coosa drainage, from Conasauga River in Polk Co., Tenn., from Swamp Creek, Whitfield Co., Ga. (type-locality of *sparus* and *difficilis*), from Cowan Creek, Cherokee Co., Ala., Little Wills Creek and Green Creek, Etowah Co., Ala.; Shoal Creek, St. Clair Co., Ala.; Choccolocco Creek, Talladega Co., Ala.; and Spring Creek, near Kewatchee Springs, Shelby Co., Ala. I have also material from the Cahaba River, in Bibb Co., Ala.

All this material shows that *M. nebulosa* is widely distributed in this region, and that the Alabama-form cannot be distinguished from that of the Tennessee. In Conasauga River, at Conasauga, Polk Co., Tenn., I collected myself 2 males and 1 gravid female (discharging glochidia, May 24, 1915). The anatomical characters are those of *M. nebulosa*, and also the glochidia are identical.

The presence, in this case of the identical species, both in the upper Tennessee and the Alabama drainages should be particularly noted, since this type of shell, although it extends (as *M. iris*) westward to the Ozarks, and northward all over the Mississippi and Ohio drainages, is not found to the southward and southwestward. Thus a connection of the Alabama range with that of the interior basin by way of the costal plain and up the Mississippi valley is excluded, and we must assume that this species managed to get across the divide between the Alabama and the Tennessee. It also should be noted that this species has been recorded from the Chattahoochee (*linguaeformis*). Simpson gives also Wolfsville, Union Co., N. Car. This is in the Catawba-Wateree drainage, far away from the rest of the range, and appears as rather doubtful.

7. *MICROMYA VIBEX* (Conrad) (1834).

Simpson, 1914, p. 136.

A species widely distributed in the Gulf drainage from Mississippi to Georgia, with a variety (*nigrina* Lea) in Florida. It is closely allied, in the shell characters, to *M. nebulosa*, but generally more elongate, with very well developed rays, which usually are wide and stand rather crowded, although they may be absent on the anterior part of the shell. The rays are not "wavy", as Simpson describes them, but rather interrupted, spot-like, but not always so. On account of the crowded character of the rays, the general color of the epidermis appears rather dark, dark green to blackish. The nacre is mostly white, rarely reddish. The shell grows to a larger size than that of *M. nebulosa*; the posterior expansion of the female is of about the same character. The synonyms given by Simpson surely belong here; they are: *U. exiguus* Lea (1840); *U. stagnalis* Conrad (1849); *U. rutilans* Lea (1856); *U. subelliptica* Lea (1856).

I have material from the Tombigbee, Sipsey, and Black Warrior River systems, from the Cahaba and Coosa drainages, up to Murray Co., Ga. and Polk Co., Tenn.; from the Escambia and Choctawhatchee drainages in southern Alabama and from the Chattahoochee in Georgia. Soft parts are at hand from the following localities.

Conasauga River, Conasauga, Polk Co., Tenn.—2 males and 1 young female, A. E. Ortmann coll., May 24, 1915.

Little River (trib. to Chattooga), Cherokee Co., Ala.—1 young male, 1 gravid female (glochidia), H. H. Smith coll., Octob., 1915.

Chocolocco Creek, White Plains, Calhoun Co., Ala.—1 male, 1 female, H. H. Smith coll., July 31, 1915.

Choctawhatchee River, Blue Springs, Barbour Co., Ala.—1 barren and 1 gravid female (glochidia), H. H. Smith coll., the former May 11, the latter Octob., 1915.

The specimens from the Choctawhatchee were labeled by Walker: *vibex* var.? I do not have the shells of them. But other specimens with shells from the Choctawhatchee drainage, thus labeled, are surely *vibex*, differing only by more or less purplish shades in the nacre, thus forming a transition to the var. *nigrina*, known from Florida. Whatever they are, the soft parts do not differ from those of *vibex*.

I have described (Ann. Carnegie Mus. 8, 1912, p. 340) the barren female of *M. vibex nigrina* (Lea). The mantle margin of the typical *vibex* essentially agrees with this. There are about 12 (or more, in *nigrina* 10) cylindro-conical papillae, of large or medium size, which are somewhat distant from each other, with a few smaller ones anterior to them. In young females, the larger papillae are nearly the same size; in the larger ones, they are more irregular, and stand at irregular intervals, and the posterior part of the mantle-edge may be without them; but a group of 6 to 8 large papillae in its anterior part is evident.

The marsupium is of the normal Lampsiline type; the number of ovisacs varies with age, from a few up to 25 or 30. The edge of the marsupium has blackish pigment.

Anal opening separated from the supraanal by a moderate mantle-connection. The anal has crenulations, the branchial opening has papillae. Inner lamina of inner gills connected with abdominal sac. Palpi with posterior margins connected at base only. The male has a few, small, and distant, rudimentary papillae on the mantle edge. Color of soft parts whitish, anal and branchial openings with black pigment, and

a streak of this runs forward along the mantle-margin. Papillae of female blackish-brown.

Glochidium subspatulate, of similar shape to that of the *iris*- and *lienosa*-groups, and closely agreeing with it in dimensions, L. 0.21, H. 0.27 mm.

Thus the anatomy bears out the relationship of this species to *M. nebulosa* and *M. iris*, and we should regard *M. vibex* as at least closely allied to *nebulosa*, from which it may have descended. The slight irregularity in the papillae of the mantle-edge, in size as well as in their distance from each other, is transitional towards forms like *lienosa*, and thus *M. vibex* may present, to a degree, a connection between the *iris*- and *lienosa*-groups.

It should be pointed out that we thus have, in the Alabama system, two species representing the form *nebulosa* of the Tennessee-drainage: an identical one, *nebulosa*, and a closely allied, but different one, *vibex*. For the latter, of course, the same should be said with regard to its origin, as to the former. However, *vibex* being distinct from *nebulosa*, we are to conclude that the conditions which brought about its distribution prevailed at least twice, at different times during the geological and geographical history of this region. There was an older connection of the waters, permitting a first immigration of the *nebulosa*-stock into the Alabama-system. This stock changed in the course of time into *vibex*, and reached a wider distribution upon the coastal plain (as far as Florida). A second immigration took place later, and the *nebulosa*-stock which then reached the Alabama-drainage did not have time enough to change its characters, and remained more geographically restricted (to the Alabama and Chattahoochee systems, chiefly in the headwaters).

(To be continued)